# Contrast Coding Practice:

## Dummy Coding

Continuous outcome of interest: Aggression

Categorical predictor variable: Music

Levels: Pop, Classical, Metal

Create a matrix showing how you would **code contrasts** if we want to compare (C1) **Classical and Pop music,** (C2) **Classical and Metal music**.

Call: **\*\*\*COMPLETELY MADE-UP DATA!!\*\*\***

lm(formula = aggression ~ music)

Residuals:

Min 1Q Median 3Q Max

-31.84 -11.85 -0.37 8.63 43.11

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 55.60 4.23 11.20 7.4e-15 \*\*\*

Clas\_Pop 1.20 1.45 .827 0.2058

Clas\_Met 10.02 2.19 2.88 1.3e-5 \*\*\*

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Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 11.4 on 57 degrees of freedom

Multiple R-squared: 0.666, Adjusted R-squared: 0.547

F-statistic: 7.35 on 1 and 57 DF, p-value: 0.0001

**In the above output, how do we interpret…**

the intercept?

Clas\_Pop?

Clas\_Met?

What is the **regression equation** for this model?

Calculate the **sample means for the three groups** (e.g., mean aggression for someone listening to metal):

What is the **total number of participants** in this experiment?

There were 20 people in the metal group; what is **the standard error of the mean aggression score** for the **metal group**?

## Effect Coding

Continuous outcome of interest: Happiness

Categorical predictor variable: Season

Levels: Spring, Summer, Fall, Winter

Create a matrix showing how you would code contrasts if we want to compare **happiness in (1) spring, (2) summer, and (3) winter, to general year-round levels of happiness**

Call: **\*\*\*COMPLETELY MADE-UP DATA!!\*\*\***

lm(formula = happiness ~ season)

Residuals:

Min 1Q Median 3Q Max

-31.84 -11.85 -0.37 8.63 43.11

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 34.89 3.56 9.80 6.4e-14 \*\*\*

Seasons1 3.74 1.38 2.71 0.0088 \*\*

Seasons2 1.02 2.88 1.76 0.1238

Seasons3 -2.70 1.07 2.64 0.0210 \*

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**In the above output, how do we interpret…**

...the intercept?

...the Seasons1 line?

...the Seasons2 line?

...the Seasons3 line?

What is our **overall summary** of this output?

What is the **regression equation** for this model?

What is our **best prediction for someone’s happiness in fall**?

## Polynomial Trends with Orthogonal Contrast Coding

Continuous outcome of interest: Number of friends

Categorical predictor variable: Age group

Levels: Young Adult, Middle Aged, Elderly

**Create a matrix showing how you would code contrasts if we want to test (1) a linear effect of age on the number of friends and (2) a quadratic effect of age on the number of friends.**

Call: **\*\*\*COMPLETELY MADE-UP DATA!!\*\*\***

lm(formula = NumFriends ~ Age)

Residuals:

Min 1Q Median 3Q Max

-31.84 -11.85 -0.37 8.63 43.11

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 27.88 3.56 9.80 6.4e-14 \*\*\*

AgeLin 5.74 2.38 2.74 0.0132 \*

AgeQuad 8.02 2.85 4.78 0.0078 \*\*

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**In the above output, how do we interpret…**

...the intercept?

...the AgeLin line?

...the AgeQuad line?

What is our **overall summary** of this output?

What is the **regression equation** for this model?

What is our **best prediction** for how many friends…

...a young adult has?

...a middle-aged person has?

...an elderly person has?

## Two Factors Coding

Continuous outcome of interest: Health

Categorical predictor variable 1: Smoke

Levels: Yes, No

Categorical predictor variable 2: Exercise

Levels: Light, Moderate, Intense

Create a matrix showing how you would code contrasts if we want to look at (1) **those who smoke (baseline) vs. not**, (2**) linear effect of exercise**, (3) a **quadratic effect of exercise**, and **interactions** between (4) 1 & 2 and (5) 1 & 3. Are these contrasts **orthogonal**?

Call: **\*\*\*COMPLETELY MADE-UP DATA!!\*\*\***

formula = health ~ smoke\*exercise

Fixed effects:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 15.99 3.56 4.49 1.9e-05 \*\*\*

Yes\_No 5.64 1.32 4.27 3.9e-05 \*\*\*

Exerlin .767 1.08 .710 0.2403

Exerquad 3.67 1.23 2.64 0.0021 \*\*

Yes\_No: Exerlin 3.12 1.23 2.64 0.0072 \*\*

Yes\_No: Exerquad 1.26 1.07 2.64 0.1222 \*

**In the above output, how do we**

the intercept?

Yes\_No?

Exerlin

Exerquad

Yes\_No:Exerlin

Yes\_No:Exerquad

What is the **regression equation** for this model?

What **predicted value** would we have for a **smoker who does intense exercising**?